

Newsletter

Syed Babar Ali School of Science and Engineering

10 | Apr-Jun 2019



UX PAKISTAN 2019 THE FUTURE OF DESIGN AND INNOVATION

SPROJ EXHIBITION

ROBOTICS COMPETITION

**SMART DATA SYSTEMS AND
APPLICATIONS LAB**

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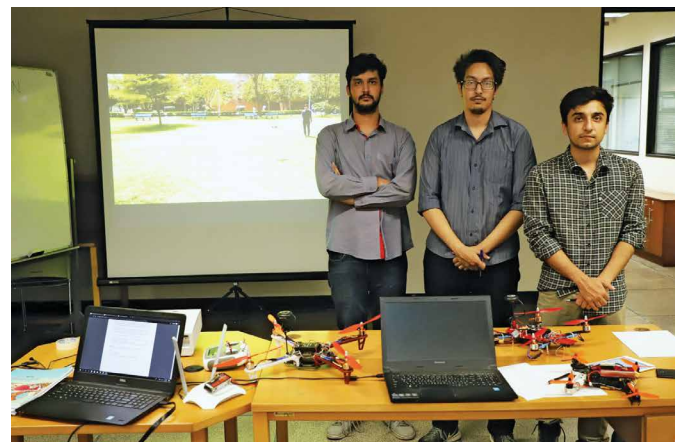
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ACADEMIC AND RESEARCH COLLABORATION AGREEMENT WITH UNIVERSITY OF LEEDS

LUMS has signed a Memorandum of Understanding (MoU) with the University of Leeds, on April 18, 2019. The agreement was signed by Dr. Terry Cousens, Senior Lecturer, Department of Civil Engineering, University of Leeds and Prof. Shahid Masud, Dean, Syed Babar Ali School of Science and Engineering (SBASSE). Dr. Kamran Asdar Ali, Dean MGSHESS, Dr. Tariq Jadoon and Dr. Momin Uppal, faculty of Electrical Engineering, were also present on the occasion. The broad scope of the academic and research collaboration agreement between the two Universities will allow for the development of collaborative research projects; organisation of joint academic activities such as courses, seminars, conferences, symposia and lectures; exchange of research and teaching personnel; placement and exchange of students and exchange of publications and other materials of common interest.

The MoU was catalysed by an ongoing research project between the Department of Electrical Engineering at LUMS and the University of Leeds. The project, led by LUMS faculty, Dr. Momin Uppal and Dr. Abubakr Muhammad along with Dr. Syed Ali Raza Zaidi from the University of Leeds, is supported by an award from the United Kingdom's Grand Challenge Research Fund (GCRF).



ICI PAKISTAN TO SUPPORT SBASSE UNDERGRADUATE STUDENT

ICI Pakistan Limited has come forward to support a scholarship grant for one female SBASSE undergraduate student. To finalise the commitment, an MoU was signed between Mr. Suhail A. Khan, VP Polyester and Soda Ash Business, ICI Pakistan and Dr. Arshad Ahmad, Vice Chancellor LUMS on April 5, 2019. SBASSE faculty also joined the Office of Advancement team to meet the ICI delegation, including Prof. Shahid Masud, Dean SBASSE, Dr. Basit Yameen, and Dr. Adnan Khan, Dean Office of Student Affairs. The meeting ended with the ICI team expressing their willingness to be involved

in counselling activities with the chosen student, as well as internship opportunities.



UX PAKISTAN 2019: THE FUTURE OF DESIGN AND INNOVATION

UX Pakistan 2019 was the 3rd iteration of the annual design conference held by the Design Society at LUMS, in collaboration with the faculty of Computer Science and the Computer Human Interaction Lab. The event was directed by Dr. Suleman Shahid with workshops conducted on April 20 and talks on April 21. The speakers and workshop hosts spanned a wide spectrum to discuss the skillsets of the designers in Pakistan which will be needed for the modern age. UX Pakistan this year included experienced professionals from companies like Jazz, Foodpanda, and Designist, along with newer up-and-coming companies like Marham and Mitti Ghar. However, one of the key parts of the event was the team of speakers from Google including

researchers, developers and designers that gave insight into emerging and developing markets for 'The Next Billion Users'.



FAST CABLES SIGNS MOU FOR FUTURE COLLABORATIONS

Kamal Mian, Director Fast Cables, accompanied by Anwar Murad, Head of Human Resources, signed two Memorandums of Understanding with the Vice Chancellor of LUMS, Dr. Arshad Ahmad on May 3, 2019. Other members present at the meeting were Prof. Shahid Masud, Dean of SBASSE and Dr. Tariq Jadoon.

Fast Cables has been sponsoring an excellence award for the highest performing graduating student since 2017 in order to appreciate their efforts, and encourage other students to also aim for excellence. With this award, the organisation aims to encourage the study of engineering as this will bring change within the industry and also

within Pakistan, fulfilling the dire need of skilled engineers in the country.



SPROJ EXHIBITION: EXCITING PROJECTS WITH GREAT POTENTIAL

The Electrical Engineering programme has been designed to prepare students to contribute to the rapidly changing and expanding needs of technology. In the final year of undergraduate studies, students are involved in a year-long capstone project that serves as a culminating academic and intellectual experience in practically applying what students have learnt to engineering design and problem solving.

The annual Senior Year Design Project Open House was held on May 3, 2019 to display the final year capstone projects of the students. The venue for the event were the labs of Electrical Engineering.

Prof. Shahid Masud, Dean SBASSE, said, "The range and quality of the projects on display clearly depicts the students' interest in the subject and also speaks of the high quality education imparted by the faculty. Some projects have the potential to turn into viable commercial products."

Professionals from different industries and colleagues from other universities were invited. They encouraged the students on their efforts and provided valuable feedback on their projects.



ROBOTICS COMPETITION

Faculty of Electrical Engineering organised a Robotics Competition, which is also the part of final module of EE-100 course, on May 06, 2019 in the Engineering Workshop Lab.

EE-100 is a core course which is designed for freshmen engineering and science students to provide them a basic introduction of various stages involved in an engineering product design i.e CAD designing, PCB designing and fabrication. Students get hands on experience on conventional and non-conventional machines such as CNC and 3D printers for rapid prototyping. Dr. Tariq Jadoon and Dr. Jahangir Ikram were the chief guests of the event.

Twenty-two student teams participated, each comprising of four/five students competed with each other to create a fastest line following or

obstacle avoiding robot. The students were provided basic components (motors, sensors, discrete electronic components) to assemble their robots and program their robots during the last two weeks of semester. The winning team "Tow Mater" has traversed track in just 45 seconds while the runner-up's "Iron Bot" traversed the track in 47.5 seconds. Certificates were given to winning and runner-up teams.



MAJOR DAY 2019 IN KARACHI

Syed Babar Ali School of Science & Engineering (SBASSE) conducted Major Day event in Karachi on April 14, 2019. The event comprised of an informed overview of the SBASSE curriculum by the Dean, followed by an extended Q&A session in which parents had their queries and concerns addressed.

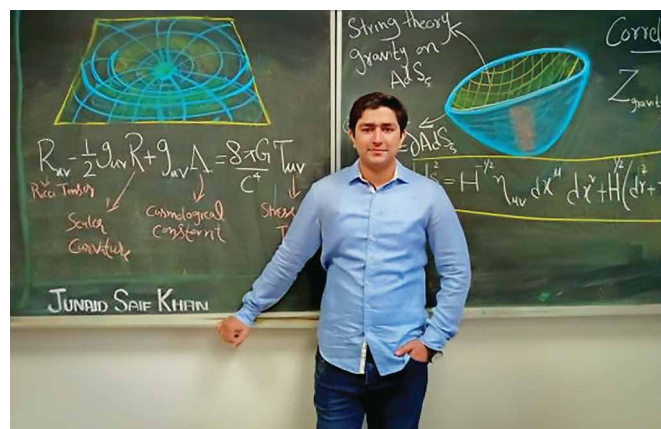
The audience really appreciated the idea and showed keen interest in participating in all such activities conducted by the school in future. A feedback survey was also conducted through which the school got important input about various concerns i.e. quality of instruction, academic workload, accessibility of SBASSE facilities etc.



ALUMNUS, JUNAID SAIF KHAN SELECTED FOR THE 69TH LINDAU NOBEL LAUREATE MEETING

Junaid Saif Khan, a Physics major from the MS Class of 2018, has been selected for the 69th Lindau Nobel Laureate Meeting taking place from June 20 - July 6, in Lindau, Germany.

Getting selected for the Lindau Nobel Laureate Meeting is an acknowledgement of a researcher's work in his respective field. The selection is exceptionally esteemed for graduate students as only the 600 most qualified young scientists from around the world are given this opportunity to enrich and share in the unique atmosphere of the Lindau Nobel Laureate Meetings.



PHD CHEMISTRY STUDENTS AWARDED COMMONWEALTH SPLIT-SITE SCHOLARSHIP

Two PhD Chemistry students, Iqra Azeem and Asma Gilane, have been awarded the Commonwealth Split-site PhD Scholarship to spend a year in UK universities.

Iqra Azeem, a third year PhD student, has joined Dr. K. H. Aaron Lau's group at University of Strathclyde, Glasgow, Scotland, to design cost-effective biosensors for the detection of Hepatitis C Virus (HCV) to timely detect HCV infection and its subsequent control, a dire need due to the alarmingly high prevalence of HCV infection in the region.

Asma Gilane, another third year PhD student, has joined Professor Abbie McLaughlin's group at Aberdeen University, Scotland, to develop solid oxide electrolytes for solid oxide fuel cells. Due to

their ecofriendly nature, high efficiency and reliability, solid state materials are becoming promising candidates for renewable energy conversion technology.



CHEMISTRY ALUMNI BAG PLACEMENTS AT LEADING US TECH COMPANY

BS Chemistry graduates consistently receive fully funded PhD admission offers from top-notch graduate schools in United States including MIT and many Ivy League universities such as Princeton University. The graduates from the class of 2012 onwards have now started completing their PhD degrees and are getting placements in the world's leading tech companies. Three Chemistry alumni from LUMS have recently been placed in Intel Corporation, a leading manufacturer of semiconductor chips and microprocessors used by all major computer system manufacturers (Apple, Lenovo, HP and Dell). Intel was ranked 5th in the list of the world's largest tech companies by Forbes magazine in 2018.



CS FACULTY PRESENTED RESEARCH WORK AT ICASSP CONFERENCE, UK

Dr. Murtaza Taj, faculty of Computer Science (CS), presented his research work at the International Conference on Acoustics, Speech and Signal Processing (ICASSP), Brighton, UK, from May 12-17, 2019. During his visit he also gave talks on different important topics as well.

In his paper, he proposed to employ an Inception-ResNet inspired, deep learning architecture called Tiny-Inception-ResNet-v2 to eliminate bonded labour by identifying brick kilns within "Brick-Kiln-Belt" of South Asia. The framework is developed by training a network on the satellite imagery consisting of 11 different classes of South Asian region. The dataset developed during the process includes the geo-referenced images of brick kilns, houses, roads, tennis courts, farms,



sparse trees, dense trees, orchards, parking lots, parks and barren lands. The dataset has been made publicly available for further research.

WIT ORGANISES VALIDATION WORKSHOP ON 'PROVINCIAL AGRICULTURE DISASTER RISK MANAGEMENT OPERATIONAL PLAN' IN PUNJAB

The Centre for Water Informatics and Technology (WIT), in support of Food and Agriculture Organization (FAO) and Department of Agriculture, Punjab, has been engaged in developing the Provincial Agriculture Disaster Risk Management Plan and its implementation guidelines (ADRMOP) for Punjab. Currently, a draft has been developed after incorporating the input and suggestions of experts. To validate its findings, a day-long workshop was held on April 4, 2019, under the supervision of Dr. Mahmood Ahmed, WIT, along with the faculty associates including Dr. Abubakar Muhammad and Dr. Sanval Nasim. The main agenda was to provide a consultation forum for stakeholders for a multistep consultation process involving all departments such as,



government officials, farmers, traders, NGOs and the private sector. Among prominent participants were Dr. Zamir Soomro (PCRWR), Sana Khalid (Agriculture Department), Mr. Habib Ullah Bodla (Planning and Development Department), and Sohaib Anwar (WWF).

BIOSYMPOSIUM ON ADVANCED NMR TECHNIQUES

A Biosymposium was organised to conduct a training workshop on Advanced Nuclear Magnetic Resonance (NMR) Techniques in Structural Biology and Chemistry as part of its Biosymposium Series on April 30, 2019. Around 50 scientists, including 20 faculty members of different universities from different cities, attended the symposium. Dr. Sabieh Anwar from the Department of Physics had a plenary talk followed by a talk by Dr. Mariya Al-Rashida from FC College University.

Three faculty members from Biology and Chemistry, Dr. Shahzad-ul-Hussan, Dr. M. Saeed and Dr. Rahman S. Saleem, gave lectures, demonstrated hands-on training on modern techniques of NMR

and answered a diverse range of scientific questions.



THE FUTURE OF ENGINEERING

A talk on current research and development across a range of engineering fields, illustrating particular topics especially in the environmental field, was held on April 19, 2019. This session was led by Dr. Terry Cousens, a Senior Lecturer at University of Leeds. The intention of the workshop was to look at areas that students may move into after completing a first degree and that may become of practical importance in the future.

Dr. Terry Cousens' research interests cover three main areas in geotechnics - fundamental stress-strain behaviour of soil, soil-structure interaction and environmental geotechnics. Work in the first area has concentrated on the behaviour of soils at low ('working') strain levels, using a version of the true triaxial apparatus and a specially designed plane strain apparatus. Various soil-structure interaction problems have been

investigated, including soil reinforcement (foundations and retaining walls) and pile behaviour.



About Speaker: Dr. Terry completed his BSc (Hons) degree in Civil Engineering from University of Leeds in 1973. He did PhD in Soil Mechanics from Cambridge in 1981. He joined Huntingdon County Council on graduation from the University of Leeds. He worked in the Highways section on the design of roads and on-site supervising construction. Currently he is working in the Soil Mechanics group at Cambridge University.

WORKSHOP ON 'FACETS OF ALGEBRAIC GEOMETRY'

Centre for Advanced Studies in Mathematics (CASM) in collaboration with Abdus Salam School of Mathematical Sciences (ASSMS) and National centre of Mathematics (NCM) organised a three-day workshop, titled 'Facets of Algebraic Geometry' from April 17-19, 2019.

The workshop focused on algebraic geometry and its connections with other areas of mathematics and physics; like Lie Algebras, Equivariant Cohomology, and Mirror Symmetry. The workshop was attended by research students, advanced researchers and faculty members of various institutions based in Islamabad and Lahore.

The workshop included lectures from Dr. Hania

Azam, Assistant Professor in the Department of Mathematics, Dr. Thomas Prince, University of Oxford, UK, Dr. Victor Przyjalkowski and Dr. Konstanti Sharamov, Steklov Mathematical Institute, Russia, and Dr. Evgeny Smirnov, Independent University Moscow, Russia.



CHEMISTRY AND BIOLOGY FACULTY TEAM UP AGAINST MULTIDRUG RESISTANCE IN CANCER

The Syed Babar Ali School of Science and Engineering believes in the concept of “no boundaries” where faculty members from different fields can team up and unearth novel solutions to prevailing scientific questions. The field of cancer research provided a similar opportunity for the research groups of Dr. Rahman Shah Zaib Saleem, faculty of Chemistry & Chemical Engineering and Dr. Amir Faisal, faculty of Biology. The two groups have been working together in preparing novel organic compounds and evaluating their anticancer potential with a focus on overcoming multidrug resistance (MDR), a major problem limiting the success of cancer therapeutics. In this regards the



team has published their latest article titled, 'Synthesis and evaluation of novel α -substituted chalcones with potent anticancer activities and ability to overcome multidrug resistance' in the journal Bioorganic Chemistry.

EXPLORING HOW CHEMISTRY IS APPLIED TO CONSERVE CULTURAL HERITAGE

Faculty of Chemistry and Chemical Engineering organised a seminar on the scope of conservation science in Pakistan and the role it has played in the restoration of cultural heritage, including historical monuments. A team of experts from Aga Khan Cultural Service Pakistan (AKCSP), who lead the project on the conservation of the picture wall of Lahore Fort presented their findings.

Zeina Naseer, a Chemistry graduate from Columbia University and a conservation scientist at AKCSP, explained how the knowledge of chemistry helped her in the conservation process especially for the glazed tiles used in the tile mosaic panels, depicting both geometric or floral designs and figurative images.



Dr. Muhammad Zaheer, Assistant Professor and the organiser of the event said, “the role of Chemistry in the conservation of art and architecture is overlooked in Pakistan and this session has created awareness about the scope of conservation science, providing new career directions to the students”.

TETRA PAK TEAM VISITS FOR FUTURE COLLABORATIONS

SBASSE hosted Tetra Pak Supply Chain Management team of the Greater Middle East and Africa (GMEA) Cluster on April 26, 2019. The team was led by GMEA supply chain cluster leader and was comprised of managers from Tetra Pak covering factories in Lahore, Jeddah, Izmir, Nairobi and Pine Town as well as representatives from the center and the local health coordination office. The School's overview was presented by Prof. Shahid Masud, Dean SBASSE, followed by the presentations of by Dr. Tariq Jadoon, Dr. Basit Yameen and Aisha Azhar respectively.

During the visit, Tetra Pak team reviewed the ongoing projects being carried in collaboration with LUMS at our Smart Data, Systems and Applications Lab led by Dr. Momin Uppal, Dr. Muhammad Tahir and Dr. Zubair Khalid. The visiting team also emphasised on carrying out joint research and development projects for building long-term



relationship and strong collaboration between the two organisations.

Tetra Pak team also visited National Incubation Center (NIC) Lahore, where Faisal Sherjan, Director Operations, briefed the team and young entrepreneurs showcased their ideas.

EE TALK: CAPTURING, VISUALISING, AND ENCODING HDR IMAGES

Electrical Engineering talk on "Capturing, Visualising and Encoding HDR Images", was held on Wednesday, June 26, 2019. The workshop was led by Dr. Ishtiaq Rasool Khan, Professor, Faculty of Computing & IT, University of Jeddah, KSA.

Talk abstract: Real world scenes have much larger dynamic range (ratio of maximum to minimum luminance) than what can be shown on traditional display screens. High dynamic range (HDR) imaging, which can capture these scenes more accurately than the traditional imaging techniques, has gained popularity in recent years.

Constructing an HDR image generally involves merging several low dynamic range (LDR) images captured at different exposures. The resultant image is represented using floating-point numbers posing some encoding challenges.

About the Speaker: Dr. Khan has published more than 80 papers, most of them as the first author, in peer-reviewed international journal. He won several competitive research grants in Singapore and Saudi Arabia and successfully completed these projects.

FACULTY NEWS:

WELCOME ON BOARD:



Dr. Naveed Ahmed, has joined as an Assistant Professor on Tenure Track in the Faculty of Mathematics.

STAFF NEWS:



Mr. Mujahid Rasheed, has joined as Officer, in the Department of Chemistry and Chemical Engineering.



Ms. Rumaisa Sana, has joined as Senior Officer, in the Office of the Dean, SBASSE.



Mr. Ahsan Saif Agha has left SBASSE after contributing excellent work during the past decade. He has served LUMS for 11 years. Dr. Tariq Jadoon, Chair of Electrical Engineering department, presented him with a farewell flower bouquet.

PHD THESIS DEFENSE:

We are glad to share the news of successful PhD defense of the following students and wish them all the best in their future endeavours.

• **Soneela Asghar**, PhD in Chemistry
Title: Advances towards transition metal-catalyzed C-H activation and cross-couplings.

• **Uzma Hira**, PhD in Chemistry
Title: Synthesis and Properties of High-Temperature Thermoelectric Oxides for Efficient Energy Harvesting.

• **Hafiza Tayyaba Shahzadi**, PhD in Chemistry
Title: Transition Metal-Catalyzed Borylation of Aromatics.

ORIENTATION WEEK'19 SCHEDULE:

The Orientation Week 2019 (O' Week) will commence on August 26, 2019, to welcome the incoming batch of 2023.

• DAY1 - Aug 26

Time:	Activity:
10:30-10:45	Introduction to School
12:00-12:45	Q&A Session

• DAY2 - Aug 27

09:00-10:30	School's Welcome – SBASSE
14:00-15:20	Academic Advisement & Planning (Managing your Life & Work)
15:20-16:00	Safe Working at SBASSE Labs

• DAY3 - Aug 28

10:10-11:00	Values & Ethics / Plagiarism
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• DAY4 - Aug 29

08:30-09:30	Academic Success at LUMS
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SMART DATA SYSTEMS AND APPLICATIONS LAB

The Smart Data Systems and Applications (SDSA) research group of the Electrical Engineering faculty, has been set-up to exploit the research opportunities offered by digital data which is being originated in every technological sector. The most probable driving factor behind this digital revolution is the emergence of unmet needs and novel applications in the market driven by availability of cheap database, middleware, cyberware, application software and ubiquitous presence of smart and low cost sensing equipment. This digital vortex creates the needs for research community to think and design in a smart way. With this motivation, we have established the group having portfolio in both foundation (relevant theory, methodologies and algorithm development) and applied (prototyping and testing) research. In SDSA, we seek the development of design principles and prototype implementations of smart solutions targeting the specific applications in different fields and areas.



Dr. Momin Ayub Uppal



Dr. Zubair Khalid

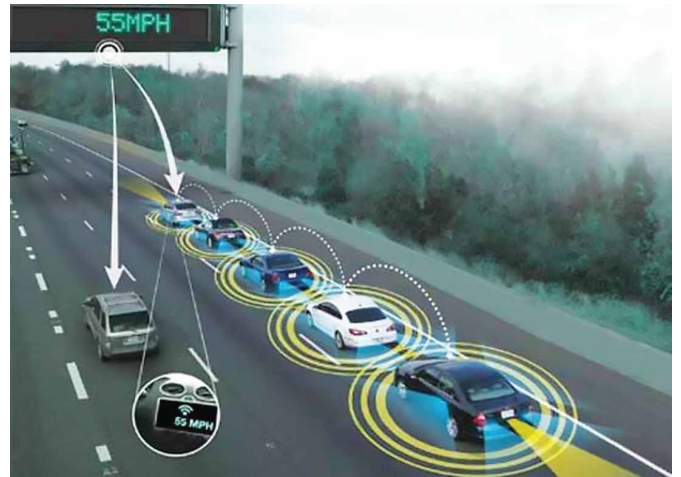


Dr. Muhammad Tahir

RESEARCH AREAS:

Intelligent Transportation

Efficient and safe transportation is not only a pre-requisite for economic development, but also important to achieve the objectives of economic integration in the world economy. It encourages the development of both agriculture and industry and provides a lot of encouragement for the growth of the tertiary sector such as banking, insurance and trading.



Industrial Revolution 4.0

Industries around the globe are in the throes of digital transformation, so-called Industrial Revolution 4.0, that is enabled by growing technologies such as Intelligent robots, smart sensors, autonomous drones, 3D printing, to name a few. Industries are introducing innovative services and digitizing their essential processes to enhance their product portfolio.

Smart-Agriculture

Smart-agriculture, or precision farming as it is known in some circles, relies to using technology to improve efficiency of farming practices, all the while ensuring that the practices remain sustainable and environmentally friendly.

Smart Health

Within this area, our objective is to try to solve some of these problems with the help of information and communication technologies.

Smart Living

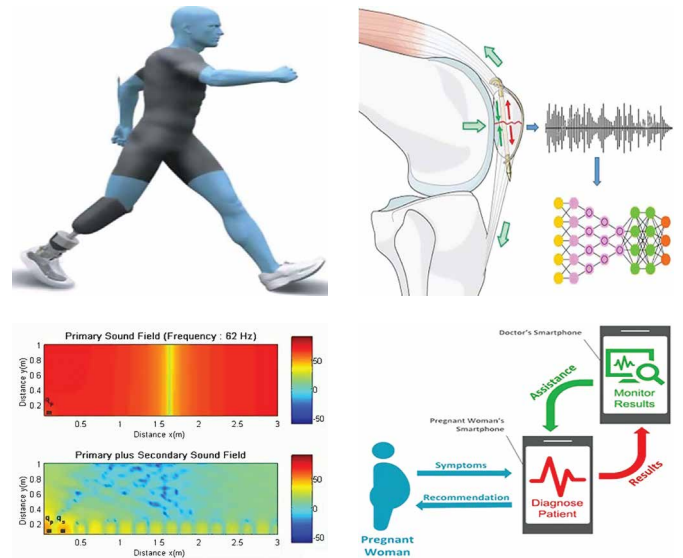
An increase in urbanisation globally due to better quality of services and ease of access to these services in cities, combined with an increase in average human life span is posing a unique type of challenge to the scientific community: to provide security, water, energy, housing, health-care, and education to the growing masses by providing efficient, reliable and sustainable solutions to ease their way of living and improve quality of life.

PROJECTS:

- Harnessing WiFi for Soil Moisture Detection in Smart-Agriculture.
- A Mobile Decision Support System for Antenatal Healthcare in Rural Settings.
- Development of a Software Defined Radio Test-bed utilizing GPS Signals for Navigation Applications.
- Acoustically Green Zones: Design and development of an active control system for noise reduction in both open and closed spaces.
- KneaBEAT: Design and development of a platform to monitor human knee health.
- A low cost, high accuracy and improved integrity cooperative driver assistance platform for enhancing traffic safety and road network efficiency.
- Design and Development of a Wearable Device Based Diagnostic and Rehabilitation Tool for

Parkinson's Disease.

- Data driven statistical learning of system dynamical models based on GP regression framework.
- Active Prosthesis Device: design and development.
- Development of Algorithm and Prototype Hardware for Estimation of Crease Geometry using Image Processing and Computer Vision Techniques.



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